

# Facts for Physicians



## Heads Up

Facts for Physicians About  
Mild Traumatic Brain Injury  
(MTBI)

DEPARTMENT OF HEALTH AND HUMAN SERVICES  
CENTERS FOR DISEASE CONTROL AND PREVENTION

## Heads Up

### Facts for Physicians About Mild Traumatic Brain Injury (MTBI)

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Mild traumatic brain injury (MTBI), commonly known as concussion, is one of the most common neurologic disorders.<sup>1</sup> Physicians can play a key role in helping to reduce the occurrence of MTBI by educating patients and the community about risks and injury prevention. Physicians can also improve patient outcomes when MTBI is suspected or diagnosed by implementing early treatment and appropriate referral.

Early MTBI symptoms may appear mild, but they can lead to significant, life-long impairment in an individual's ability to function physically, cognitively, and psychologically. Although currently there are no standards for treatment and management of MTBI, appropriate diagnosis, referral, and patient and family education are critical for helping MTBI patients achieve optimal recovery and to reduce or avoid significant sequelae.<sup>2</sup>

## Magnitude of Traumatic Brain Injury (TBI) and MTBI

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### TBI

Each year in the United States:

- Approximately 1.5 million Americans sustain traumatic brain injuries, ranging from mild to severe;<sup>3</sup>
- 50,000 people die from TBIs;<sup>3</sup>
- 230,000 people are hospitalized due to TBIs and survive;<sup>3</sup>



- More than 1 million are treated in emergency departments for TBIs;<sup>4</sup>
- An estimated \$56 billion is spent in direct and indirect costs as a result of all TBIs;<sup>5</sup> and
- 80,000 to 90,000 Americans experience onset of long-term disability from TBIs.<sup>6</sup>

## MTBI

- Data suggest that as many as 75% of all brain-injured people sustain MTBIs.<sup>7</sup>
- MTBIs cost the nation nearly \$17 billion each year.<sup>6</sup>
- An unknown proportion of those who are not hospitalized may experience long-term problems, such as:<sup>2, 8</sup>
  - Persistent headache,
  - Confusion,
  - Pain,
  - Cognitive and/or memory problems,
  - Fatigue,
  - Changes in sleep patterns,
  - Mood changes, and/or
  - Sensory problems such as changes in vision or hearing (post-concussion syndrome).
- In most cases of diagnosed MTBI, the patient recovers fully.<sup>2, 8, 9</sup>
- Some research indicates that up to 15% of patients diagnosed with MTBI may have experienced persistent disabling problems.<sup>8, 9</sup>



Data suggest that as many as 75% of all brain-injured people sustain MTBI.<sup>7</sup>



## Conceptual Definition of MTBI

Experts from the Centers for Disease Control and Prevention's MTBI Working Group define a case of MTBI as the occurrence of injury to the head arising from blunt trauma or acceleration or deceleration forces with one or more of the following conditions attributable to the head injury:

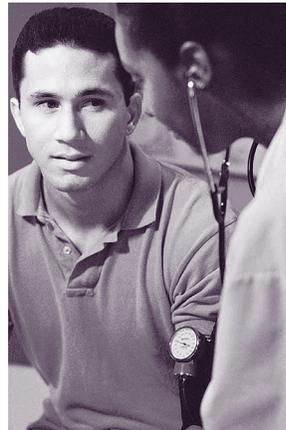
### Any period of observed or self-reported:

- Transient confusion, disorientation, or impaired consciousness;
- Dysfunction of memory around the time of injury; or
- Loss of consciousness lasting less than 30 minutes.



### Observed signs of other neurological or neuropsychological dysfunction, such as:

- Seizures acutely following injury to the head;
- Irritability, lethargy, or vomiting following head injury, especially among infants and very young children; or
- Headache, dizziness, irritability, fatigue, or poor concentration, especially among older children and adults.



TBIs may include both concussions and contusions. The term “concussion” is used at times interchangeably with the term “mild

TBI.” But the category of diagnosed concussions covers a clinical spectrum. Concussion may occur without loss of consciousness. Mild concussion may be present even if there is no external sign of trauma to the head. The Quality Standards Subcommittee of the American Academy of Neurology defines the spectrum of concussions related to sports injuries as follows:<sup>10</sup>

### Grade 1 Concussion

Transient confusion, no loss of consciousness, and duration of mental status abnormalities on examination that resolve in less than 15 minutes.



### Grade 2 Concussion

Transient confusion, no loss of consciousness, concussion symptoms or mental status abnormalities on examination that last more than 15 minutes.

For guidelines about concussions not related to sports, see the article by McCrea, Kelly, et al. contained on the CD-ROM in this brain injury tool kit.

### Grade 3 Concussion

Any loss of consciousness, either brief (seconds) or prolonged (minutes).

#### Leading causes of TBI

- Motor vehicle crashes<sup>5</sup>,
- Falls<sup>5</sup>,
- Firearm use<sup>5</sup>, and
- Sports/recreational activities<sup>7</sup>.

#### Groups most at risk for TBI<sup>5</sup>

- Adolescents and young adults (ages 15 to 24) and
- Older adults (ages 65 and older)

## Primary Prevention

As part of preventive care, physicians can provide information to patients, families, and caregivers about risk behaviors and activities that increase potential for TBIs of all types. Recommendations for preventing TBIs include those listed below. (These tips also are available on the patient information sheet, *Heads Up: Preventing Brain Injury*, contained in this brain injury tool kit.)

- Wear a seat belt every time you drive or ride in a motor vehicle.
- Never drive while under the influence of alcohol or drugs.
- Always buckle your child into a child safety seat, booster seat, or seat belt (depending on the child's height, weight, and age) in the car.
- Wear a helmet and make sure your children wear helmets when:
  - Riding a bike, motorcycle, snow mobile, or all-terrain vehicle;
  - Playing a contact sport, such as football, ice hockey, or boxing;
  - Using in-line skates or riding a skateboard;
  - Batting and running bases in baseball or softball;
  - Riding a horse; and
  - Skiing or snowboarding.



- Avoid falls in the home by:
  - Using a step stool with a grab bar to reach objects on high shelves;
  - Installing handrails on stairways;
  - Installing window guards to keep young children from falling out of open windows;
  - Using safety gates at the top and bottom of stairs when young children are around;
  - Maintaining a regular exercise program to improve strength, balance, and coordination;
  - Removing tripping hazards, using non-slip mats in the bathtub and on shower floors, and putting grab bars next to the toilet and in the tub or shower; and
  - Having vision tested regularly to decrease the risk of falling.
- Make sure the surface on your child's playground is made of shock-absorbing material (e.g., hardwood mulch, sand); and
- Keep firearms stored unloaded in a locked cabinet or safe. Store bullets in a separate secure location.

Have vision tested regularly to decrease the risk of falling



PREVENTION



## Signs and Symptoms

Signs and symptoms of an injury to the brain may include:<sup>2,8,9,11</sup>

### DIAGNOSIS

Cognitive symptoms	Physical symptoms	Behavioral changes
<ul style="list-style-type: none"><li>• Attention difficulties,</li><li>• Concentration problems,</li><li>• Memory problems, and/or</li><li>• Orientation problems.</li></ul>	<ul style="list-style-type: none"><li>• Headaches,</li><li>• Dizziness,</li><li>• Insomnia,</li><li>• Fatigue,</li><li>• Uneven gait,</li><li>• Nausea,</li><li>• Blurred vision, and/or</li><li>• Seizures.</li></ul>	<ul style="list-style-type: none"><li>• Irritability,</li><li>• Depression,</li><li>• Anxiety,</li><li>• Sleep disturbances,</li><li>• Problems with emotional control,</li><li>• Loss of initiative, and/or</li><li>• Problems related to employment, marriage, relationships, home management, or school management.</li></ul>

## Diagnosis

MTBI diagnosis should be considered when one or more of the following conditions occur following a brain injury:<sup>2,8</sup>

- Confusion or disorientation,
- Amnesia near the time of the injury,
- Loss of consciousness up to 30 minutes,
- Neurological or neuropsychological problems, and/or
- Score of 13 or higher on the Glasgow Coma Scale (GCS).

Diagnosing MTBIs can be challenging because symptoms often are common to other medical problems, and onset of symptoms may occur days, weeks, or months after the initial injury.<sup>2,8</sup> In diagnosing children, physicians can refer to the 1999 recommendations of the American Academy of Family Physicians and the American Academy of Pediatrics contained on the CD-ROM in this brain injury tool kit and available on the Internet at <http://www.aap.org/policy/ac9858.html>.

In assessing patients for possible MTBI, it is important for physicians to determine whether there is any evidence that a brain or other intracranial injury is present or is likely to have occurred, especially among:

- Patients who did not see a physician after sustaining an injury,
- Patients referred by an emergency department,
- Patients facing orthopedic or facial trauma surgery, and
- Patients who did not receive follow-up care following admission to a hospital for an injury.

### Diagnostic tests

Diagnostic tests may include imaging. In certain circumstances (for example, when a patient is a participant in sporting events) evidence-based evaluation guidelines, such as the American Academy of Neurology Practice Parameter: The Management of Concussion in Sports, can be used. The CD-ROM in this brain injury tool kit contains the summary statement of these guidelines. For information about non-sports-related concussions, refer to the McCrae, Kelly, et al. article, also contained on the CD-ROM. Neuropsychological tests are useful to identify cognitive deficits, both acutely and during the follow-up period.

### History Taking

Close, careful history taking is essential in diagnosing MTBI.

Questioning patients as to whether they have had an injury or accident is an important first step because some patients may not mention it to their physicians. Reasons for this may include:

- Some may not consider the injury serious because they were told the condition was mild or just a "bump on the head,"
- Some may not realize they received a head injury because they were briefly unconscious at the time of the incident,
- Some may focus on a more severe injury that occurred at the same time,
- Some may be too embarrassed to mention certain symptoms, such as memory problems.<sup>2</sup>

For these reasons careful history taking to ascertain the nature of the problem is very important.

## Clinical Management

Because the effects of MTBI can be so diverse, no standard treatment exists. But physicians can take many actions to improve outcomes for patients with MTBI. Treatment outcome is dependent on the appropriate diagnosis of factors potentially responsible for persistent symptoms such as psychiatric problems and post-injury conditions (for example, post-traumatic migraine among persons with family history of migraine).<sup>2,8</sup> Management of patients with MTBI may include a spectrum of approaches, beginning with patient and family education and possibly encompassing medical treatment, physical-psychiatric therapies, and occupational interventions.<sup>2</sup>

### Management Approaches

Consideration of physical, emotional, and/or behavioral signs and symptoms will guide management plans. Those plans may include some or all of the following approaches:<sup>2,8</sup>

- Evaluating and treating patients who present early for somatic complaints and documenting baseline neurological findings, including cognitive and emotional state;
- Assessing the ability of the patient to return to everyday activities, such as sports, work, or operating motor vehicles;
- Educating patients and their families about the treatment plan and expected outcomes;
- Prescribing medication, as appropriate, for significant anxiety or depression;
- Referring patients, as appropriate, to neurologists and/or psychiatrists when emotional or cognitive symptoms interfere with normal routines and relationships;
- Referring patients to specialized multidisciplinary cognitive therapy programs, as appropriate. Such programs may include psychotherapy, occupational/vocational, or adaptive strategy training;
- Providing copies of the enclosed patient materials, *Heads Up: Preventing Brain Injury* and *Facts about Concussion and Brain Injury*, when appropriate.

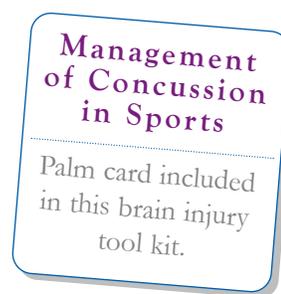
More detailed information about clinical management of patients with MTBI can be found on the CD-ROM contained in this brain injury tool kit, including several journal publications and a 1998 National Institutes of Health Consensus Development Conference Statement outlining approaches to recovery and rehabilitation for the full spectrum of traumatic brain injuries (also available on the Internet at [http://odp.od.nih.gov/consensus/cons/109/109\\_statement.htm](http://odp.od.nih.gov/consensus/cons/109/109_statement.htm)).

For in-depth information about treating children, physicians can refer to the 1999 recommendations of the American Academy Family Physicians and the American Academy of Pediatrics contained on the CD-ROM in this brain injury tool kit and available on the Internet at <http://www.aap.org/policy/ac9858.html>. Encourage parents to be vigilant in observing small children who may have sustained even a slight bump on the head, and instruct them about signs and symptoms to watch for.<sup>2</sup>

### Preventing Secondary Injury

MTBI is associated with diminished reaction time and risk for secondary injury. Providing written instructions on a patient's discharge sheet regarding timing for return to regular and high-risk activities may help prevent this type of injury, especially in regard to the following:<sup>12</sup>

- Returning to high-risk sports participation (i.e., horseback riding, snowboarding, skiing, roller blading, cycling);
- Driving a motor vehicle; and
- Operating machinery.



Written instructions also may be used by families to provide information to teachers and coaches of children and young adults in school and college settings. The *Management of Concussion in Sports* palm card provided in this brain injury tool kit may be suitable for sharing with school and coaching personnel.

## Communication

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### Working with MTBI Patients, Family Members, and Caregivers

Effective physician-patient communications are always challenging, especially given the time constraints most practitioners face today. Communicating with patients who may have MTBI may be even more difficult depending on the degree of the patient's impairment. Physicians may sometimes find it useful to prompt patients for additional information about the injury. A parent, guardian, or other caregiver also may be able to share additional information about the nature and circumstances of the injury.

COMMUNICATION



## Approaches for Enhancing Physician-Patient Communication<sup>13</sup>

- Observe the patient closely to check for physical, cognitive, or behavioral changes that might signal MTBI.
- Question your patient and/or the caregiver closely. When possible, ask questions to elicit more details about the injury, such as “Tell me about,” or “Describe...”
- Listen carefully for information the patient or caregiver may give you about difficulties in physical, cognitive, or behavioral status.
- Provide additional printed information to patients about the condition and expectations, appropriate referrals, and available community resources.
- Write out clear instructions for the patient and/or caregiver to take home and, as appropriate, to share with workplace supervisors or school staff.
- Refer patients to physicians who specialize in brain injury, as necessary.
- Steer patients to available community resources that may provide additional support.
- Follow up with patients to ensure that any MTBI-related problems are addressed in a timely fashion. Flag charts or otherwise make note of the need to follow individuals who have possible MTBIs.



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CDC does not endorse the articles, products, or guidelines of other organizations or individuals referenced in these materials. CDC provides this information to raise awareness about the magnitude of mild traumatic brain injury as a public health issue and to offer a scientific overview of the topic.

The Centers for Disease Control and Prevention gratefully acknowledges the following organizations for their participation in this project:

- American Academy of Family Physicians
- American Academy of Physical Medicine and Rehabilitation
- American College of Physicians-American Society of Internal Medicine
- American Osteopathic Association
- American Trauma Society
- Brain Injury Association of America
- Brain Injury Medicine and Rehabilitation Program, Rehabilitation Institute of Chicago
- Defense and Veterans Head Injury Program
- International Brain Injury Association
- Research and Training Center on the Community Integration of Individuals with TBI, Mount Sinai School of Medicine
- U.S. Health Resources and Services Administration



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